IOP Conference Series: Materials Science and Engineering 2016 vol.158 N1

The study of the wedge-shaped vibration-driven robot motion in a viscous fluid forced by different oscillation laws of the internal mass

Nuriev A., Zakharova O., Zaitseva O., Yunusova A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd.A rectilinear motion of a two-mass system in a viscous incompressible fluid is considered. The system consists of a shell having the form of an equilateral triangular cylinder and a movable internal mass. The motion of the system as a whole is forced by longitudinal oscillations of the internal mass relative to the shell. This mechanical system simulates a vibration-driven robot, i.e. a mobile device capable to move in a resistive medium without external moving parts. Investigation of the system is carried out by a direct numerical simulation. A comparative analysis of the characteristics of the motion and flow regimes around the vibration-driven robot is carried out for different internal mass oscillation laws.

http://dx.doi.org/10.1088/1757-899X/158/1/012072